



# ENERGY STAR® Lighting Certification

Taylor Jantz-Sell, U.S. EPA

Austin A. Gelder, ICF International

December 5, 2013

Part of the  
2013 ENERGY STAR® Products Partner Meeting  
Webinar Series



Learn more at [energystar.gov](http://energystar.gov)

# Outline

---



- Roles & Responsibilities
- Resources for Certification
- Product Families
- Inseparable SSL
- Transition to Lamps V1.0
- Discussion / Q&A



# Roles and Responsibilities

# Who are lighting partners?



- Entities that have signed a partnership agreement with EPA
  - partner commitments vary by partner type
- Lighting Related Partner Types
  - Retailers: Retailers or e-tailers that sell ENERGY STAR certified lighting products
  - Utilities that promote ENERGY STAR certified lighting products
  - Manufacturers

# Manufacturing partners



- ENERGY STAR manufacturer partnership is limited to organizations that own and/or license a brand name under which they sell eligible products in the United States and/or Canada.
  - Partnership is not available to original equipment manufacturers (OEMs) that do not sell directly to consumers or end users in the United States.
  - OEMs may certify products on behalf of the ENERGY STAR brand owners/licensees; however the brand owner must be the ENERGY STAR partner associated directly with the certified product models, since only partners are authorized to use the ENERGY STAR certification mark.
- Must have at least one certified product

# Partner Roles & Responsibilities



- Abide by the partner commitments
- Know and regularly use the ENERGY STAR specifications
- Know your options
  - More than 64 labs and 13 CBs for lighting
- Remember it's a partnership and you have a voice – we want to hear your input

# Partner Commitments



- Pages 1-3 of every specification
- Topics covered:
  - Qualifying Products
  - Using the ENERGY STAR Name and Marks
  - Verifying Ongoing Product Qualification
  - Providing Information to EPA
  - Performance for special distinction



## ENERGY STAR® Program Requirements for Lamps (Light Bulbs)

### Partner Commitments

Following are the terms of the ENERGY STAR Partnership Agreement as it pertains to the manufacture and labeling of ENERGY STAR qualified products. The ENERGY STAR Partner must adhere to the following partner commitments:

#### Qualifying Products

1. **Comply with current ENERGY STAR Eligibility Criteria**, which define performance requirements and test procedures for Lamps. A list of eligible products and their corresponding Eligibility Criteria can be found at [www.energystar.gov/specifications](http://www.energystar.gov/specifications).
2. **Prior to associating the ENERGY STAR name or mark with any product**, obtain written certification of ENERGY STAR qualification from a Certification Body recognized by EPA for Lamps. As part of this certification process, products must be tested in a laboratory recognized by EPA to perform Lamp testing. A list of EPA-recognized laboratories and Certification Bodies can be found at [www.energystar.gov/testingandverification](http://www.energystar.gov/testingandverification).

#### Using the ENERGY STAR Name and Marks

3. Comply with current ENERGY STAR Identity Guidelines, which define how the ENERGY STAR name and marks may be used. Partner is responsible for adhering to these guidelines and ensuring that its authorized representatives, such as advertising agencies, dealers, and distributors, are also in compliance. The ENERGY STAR Identity Guidelines are available at [www.energystar.gov/logo](http://www.energystar.gov/logo).
4. Use the ENERGY STAR name and marks only in association with qualified products. Partner may not refer to itself as an ENERGY STAR Partner unless at least one product is qualified and offered for sale in the U.S. and/or ENERGY STAR partner countries.
5. Provide clear and consistent labeling of ENERGY STAR qualified Lamps.
  - 5.1. The ENERGY STAR mark must be clearly displayed on the front or primary display panel of the product packaging, in product literature (i.e., user manuals, spec sheets, etc.) and on the manufacturer's Internet site where information about ENERGY STAR qualified models is displayed.

#### Verifying Ongoing Product Qualification

6. Participate in third-party verification testing through a Certification Body recognized by EPA for Lamps, providing full cooperation and timely responses. EPA/DOE may also, at its discretion, conduct tests on products that are referred to as ENERGY STAR qualified. These products may be obtained on the open market, or voluntarily supplied by Partner at the government's request.
7. Notify ENERGY STAR Certification Body recognized by EPA for Lamps, within 30 days, if the designated suppliers of any certified private labeled Lamps change to a new supplier.

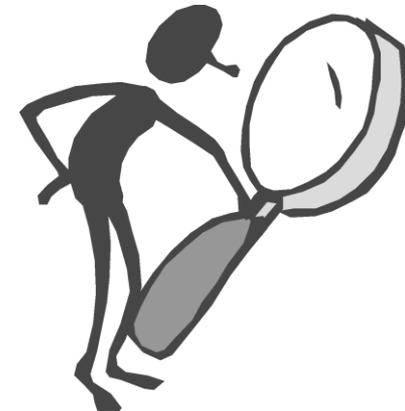
#### Providing information to EPA

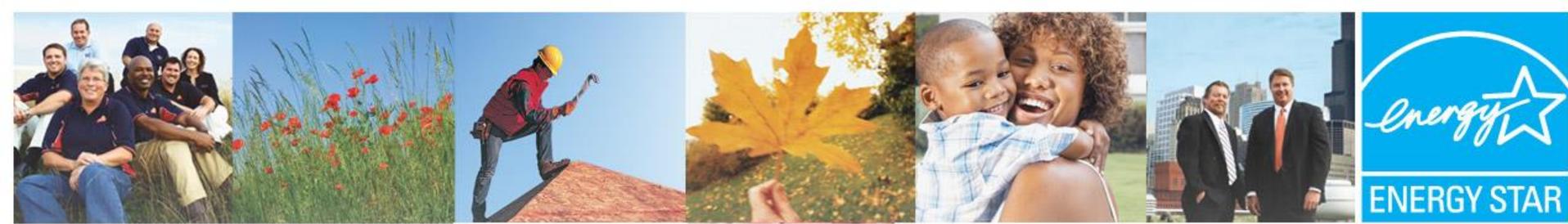
8. Provide unit shipment data or other market indicators to EPA annually to assist with creation of ENERGY STAR market penetration estimates, as follows:

# Consult your CB first, CBs consult with EPA if something is unclear



- Scope or requirement clarifications, e.g.
  - Does a CFL PAR have to meet the intensity requirement in the Lamps specification?
  - Do wire nuts meet the requirement for ballast replace-ability in a luminaire?
  - Does a specific product fit in the scope of ENERGY STAR lighting specifications
  - What can be done for products with unique or special features?
  - Does a product fit the definition of an LED Light Engine?
- Questions about testing or test reports
- When in doubt: **Ask**





# Questions or Clarifications on Roles & Responsibilities?

Up next

- Resources for Certification
- Product Families
- Inseparable SSL
- Transition to Lamps V1.0
- Discussion / Q&A





# Resources for Certification

# Top 5 Resources for Lighting Product Certification



1. ENERGY STAR specifications  
[www.energystar.gov/specifications](http://www.energystar.gov/specifications)
2. EPA answers to frequently asked questions  
[www.energystar.gov/lightingfaqs](http://www.energystar.gov/lightingfaqs)
3. EPA recognized Certification Bodies
  - [Find](#) EPA recognized labs and CBs
4. EPA contractor support team  
[lighting@energystar.gov](mailto:lighting@energystar.gov)
5. EPA ENERGY STAR Lighting Program Manager  
Taylor Jantz-Sell [jantz-sell.taylor@epa.gov](mailto:jantz-sell.taylor@epa.gov)

# Additional Certification Resources

---

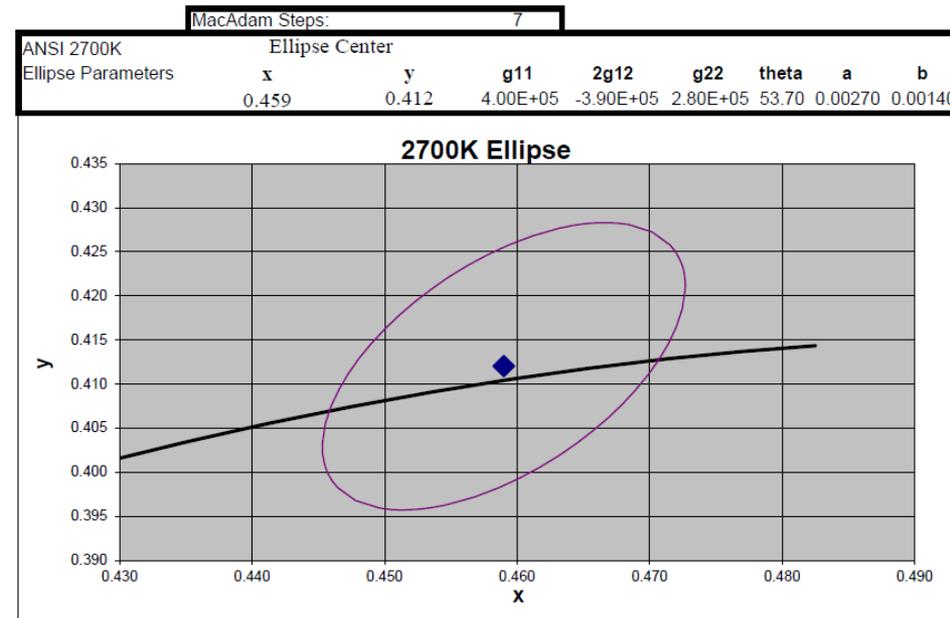


- Certifying Luminaires:
  - [Certified Lighting Subcomponent Database \(CSD\)](#)
  - [Utilizing the Certified Subcomponent Database](#)
  - [LED Light Engines and GU24 Based LED Lamps](#)
  - [Maximizing Testing Investment](#)
- Certifying Lamps
  - [ANSI Ellipse Data Templates \(for CFLs\)](#)
  - [Lamps V1.0 Dimming Data Submission Form](#)
  - [Recertification Testing Guides – CFLs](#)
  - [Recertification Testing Guides – LED Lamps](#)
  - [Center Beam Intensity Tool](#)
- [Lumen Maintenance Guidance](#)
- [TM-21 Calculator](#)

# CFL 7-Step Ellipse



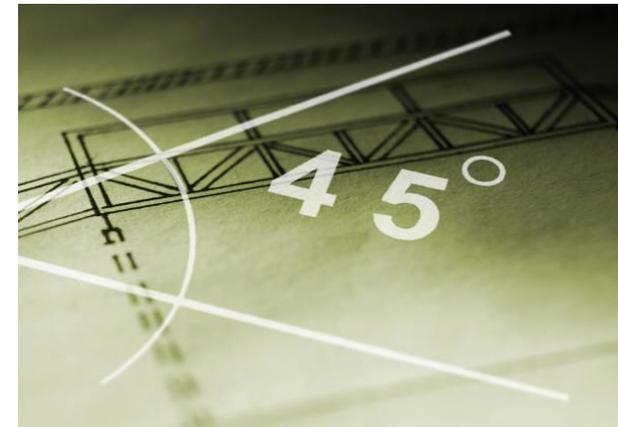
- Ellipse criteria for CFL Chromaticity Requirements posted to the [ENERGY STAR Lamps](#) site for convenience
- Identical ellipses as the CFL V4.3 Specification



# Center Beam Intensity Tool



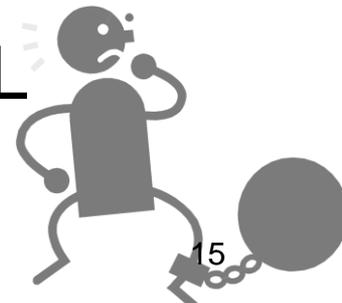
- CBCP Tool applies to all PAR and MR Lamps
- Updated and now makes clear the capabilities and limitations for allowable beam angles and wattages
  - [www.energystar.gov/LampsCBCP](http://www.energystar.gov/LampsCBCP)
  - Max angle of  $65^{\circ}$  for PAR lamps
  - Max angle of  $50^{\circ}$  for MR lamps
  - Wattages based on the data set



# WMTL and SMTL Data Portability



- Witnessed Manufacturer Testing Laboratory (WMTL) and Supervised Manufacturer Testing Laboratory (SMTL) data is only usable with the CB that the laboratory is enrolled with
- Test data from a WMTL or SMTL is NOT portable between CBs
  - LM-80 data is CB specific
  - Private labelers must use same CB as OEM
- NOTE: A manufacturer laboratory can participate in multiple CBs' WMTL or SMTL programs



# LM-80 Report Applicability



- The [Lumen Maintenance Guidance](#) applies to SSL Luminaires and SSL Lamps in Lamps V1.0 Specification for early initial certification
- How CCTs work:
  - **Warm White** (2700K, 3000K, 3500K) LM-80 can be used for **Warm White** and **Cool White** end products
  - **Cool White** (4000K, 4500K, 5000K, 5700K, 6500K) LM-80 can only be used for **Cool White** end products
    - E.g.
      - A 3500K CCT LM-80 report can be used for lamps with CCTs between 2700K and 6500K
      - A 5000K CCT LM-80 report can be used for lamps with CCTs between 4000K and 6500K

# Resources for Certification: The Certified Lighting Subcomponent Database





# What is the CSD?

- Contains test data for lighting subcomponents that has been certified by EPA-recognized Laboratories:
  - Fluorescent lamp-ballast platforms
  - Fluorescent lamps
  - Fluorescent ballasts
  - CFL GU24 based lamps
  - LED GU24 based lamps
  - LED Light Engines

	A	B	C	D	E	F	G	H	I	J	
1	Certified Lighting Subcomponents - Light Engines and GU24 Based LED Lamps										
2	Last Updated September 13, 2013										
3											
4											
5		Lamp or Light Engine Manufacturer	Lamp or Light Engine Brand Name	Lamp or Light Engine Model Name	Lamp or Light Engine Model Number	Additional Model Information	Date CB Notified	Manufacturer of Product	Date Tested	Product Type	Lamp Type
6		Maxlite	MaxLED	SKB010GUDLED30	SKB010GUDLED30		3/11/2013		2/25/2013	GU24 Based Integrated	Omnidirectional
7		Opto Electronic	OptoElectronic	ULIULE163VW0 42 K30C80L1100	ULE163VW0 42 K30C80L1100		3/6/2013		2/28/2013	LED Light Engines	
8		Opto Electronic	OptoElectronic	ULIULE163VW1 42 K40C80L1100	ULE163VW1 42 K40C80L1100		3/6/2013		2/28/2013	LED Light Engines	
9		Philips (China) Inv PHILIPS	Fortimo	LED TDLM	1100 827 120V G2		12/13/2012		12/5/2012	LED Light Engines	
10		Philips (China) Inv PHILIPS	Fortimo	LED TDLM	1100 827 277V G2		3/14/2013		3/8/2013	LED Light Engines	
11		Philips (China) Inv PHILIPS	Fortimo	LED TDLM	1100 830 120V G2		12/13/2012		12/5/2012	LED Light Engines	
12		Philips (China) Inv PHILIPS	Fortimo	LED TDLM	1100 830 277V G2		3/14/2013		3/8/2013	LED Light Engines	
13		Philips (China) Inv PHILIPS	Fortimo	LED TDLM	1100 835 120V G2		12/13/2012		12/5/2012	LED Light Engines	
14		Philips (China) Inv PHILIPS	Fortimo	LED TDLM	1100 835 277V G2		3/14/2013		3/8/2013	LED Light Engines	
15		Philips (China) Inv PHILIPS	Fortimo	LED TDLM	1100 840 120V G2		3/14/2013		3/8/2013	LED Light Engines	
16		Philips (China) Inv PHILIPS	Fortimo	LED TDLM	1100 840 277V G2		3/14/2013		3/8/2013	LED Light Engines	
17		Philips (China) Inv PHILIPS	Fortimo	LED TDLM	2000 827 120V G2		12/13/2012		12/5/2012	LED Light Engines	
18		Philips (China) Inv PHILIPS	Fortimo	LED TDLM	2000 827 277V G2		3/14/2013		3/8/2013	LED Light Engines	
19		Philips (China) Inv PHILIPS	Fortimo	LED TDLM	2000 830 120V G2		12/13/2012		12/5/2012	LED Light Engines	
20		Philips (China) Inv PHILIPS	Fortimo	LED TDLM	2000 830 277V G2		3/14/2013		3/8/2013	LED Light Engines	
21		Philips (China) Inv PHILIPS	Fortimo	LED TDLM	2000 835 120V G2		12/13/2012		12/5/2012	LED Light Engines	
22		Philips (China) Inv PHILIPS	Fortimo	LED TDLM	2000 835 277V G2		3/14/2013		3/8/2013	LED Light Engines	
23		Philips (China) Inv PHILIPS	Fortimo	LED TDLM	2000 840 120V G2		3/14/2013		3/8/2013	LED Light Engines	
24		Philips (China) Inv PHILIPS	Fortimo	LED TDLM	2000 840 277V G2		3/14/2013		3/8/2013	LED Light Engines	
25		SATCO/INUVO	Satco/KolourOne	80905	80905		7/19/2013		5/31/2013	LED Light Engines	
26		SATCO/INUVO	SATCO PRODUCT1S9994	58994	58994		7/1/2013		4/20/2013	GU24 Based Integrated	Omnidirectional



# What the CSD is NOT



- The CSD is **NOT** ENERGY STAR certification for subcomponents
- The CSD is **NOT** a guarantee of ENERGY STAR certification for every luminaire
  - The ultimate certification rides on the complete package including how the source performs in the fixture

# How does the CSD help?



- How does the CSD help luminaire manufacturers?
  - **Reduces the bulk of certification testing and time by having data already tested by an EPA-recognized test lab**
- How does the CSD help subcomponent manufacturers?
  - **Gets attention from luminaire manufacturers who are looking for suppliers**

# Certifying Directional Luminaires Leveraging the CSD



- Performance based on the light source and fixture combined
  - Includes fixture impact on key performance criteria such as light output, efficacy, CCT, etc.
- Allowed sharing:
  - Typically allows sharing of electrical performance data
  - Allows use of the lifetime and lumen maintenance testing

# Subcomponent Updates



- The partner / luminaire manufacturer must keep the subcomponents updated with the Certification Body
  - The luminaire manufacturer is responsible for the performance of the luminaire
  - If suppliers change, testing may be required
  - Substitutions should perform as good or better than what was used for certification



# Time for Discussion



Questions or clarifications on resources?

Up Next

- Product Families
- Inseparable SSL
- Transition to Lamps V1.0
- Discussion / Q&A





# Product Families



# Product Families



- Also referred to as Allowable Variations
  - Found in the front of specification
  - Representative model should be worst case
- Purpose is to facilitate sharing of data where appropriate to reduce testing burden
- Expanded opportunities with Lamps V1.0

# Old Bulb Specifications



- **CFL:** Specification did not address sharing of data for product variations
- **Integral LED Lamps:** Introduced some provisions to allow data sharing for limited product variations
  - Lamp paint color
  - Lamp beam angle
  - Lamp base

# Lamps V1.0



Table 2: Allowable Variations

Lamp Attribute	Allowable Variation	Additional Test Data Required For Each Variant
Heat Sink Paint Color (solid-state only)	Lamp body color/pigment. (Not the type of paint or plastic).	None
Beam Angle (solid-state only)	The dimensions of lamp secondary optics (e.g. lens thickness, refractor patterns). Variation in secondary optical material not allowed.	<ul style="list-style-type: none"> <li>Luminous intensity distribution data</li> <li>Center Beam Intensity</li> <li>Color Angular Uniformity</li> </ul>
Lamp Base (ANSI base adapter)	Lamp base type (e.g. ANSI E26, GU24, etc.)	None
Envelope Shape (decorative shapes only)	Lamp envelope shape, so long as the envelope material and thickness are unchanged. The surface area and volume of the tested representative model's envelope shall be less than or equal to that of the variant.	None
Envelope Finish (decorative shapes only)	Lamp envelope finish, so long as the envelope material and thickness are unchanged. The surface area and volume of the tested representative model's envelope shall be less than or equal to that of the variant.	<ul style="list-style-type: none"> <li>Luminous Efficacy</li> <li>Light Output</li> <li>Correlated Color Temperature</li> <li>Color Rendering</li> </ul>
Correlated Color Temperature	<p>This allows sharing of specific test data, as applicable, for CFL and SSL lamps where the only variation is in phosphor:</p> <ul style="list-style-type: none"> <li>Lumen Maintenance</li> <li>Rated Life</li> <li>Color Maintenance</li> <li>Electrical Safety</li> <li>Electrical - Rapid Cycle Stress, Power Factor, Transient Protection, Frequency and Start Time</li> <li>Dimming Performance – Minimum and Maximum Light Output, Audible Noise, and Flicker</li> <li>Lamp Shape Dimensions</li> <li>Lamp Toxics Reduction</li> </ul> <p>Only the tested representative model is required to complete lumen maintenance and full rated life testing as applicable.</p>	<ul style="list-style-type: none"> <li>Luminous Efficacy</li> <li>Light Output</li> <li>Elevated Temperature Light Output Ratio (as applicable)</li> <li>Center Beam Intensity (as applicable)</li> <li>Luminous Intensity Distribution (as applicable)</li> <li>Correlated Color Temperature</li> <li>Color Rendering</li> <li>Color Angular Uniformity (SSL only and as applicable)</li> <li>Run- Up Time (CFLs only)</li> </ul>

# Lamps V1.0 Examples



- Tested lamp: a decorative candle LED lamp is tested with the following attributes:
  - CCT = 2700K
  - Envelope = BA10 Frosted angle-tip candle envelope
  - Lamp base = E12 candelabra base
  - Lamp heat sink paint = white

# Lamps V1.0 Examples

- The manufacturer wants to add the following family variations:
  - 3000K and 4000K CCTs (0-hour testing)
  - Clear Envelopes (limited 0-hour testing)
  - G16.5 globe and B10 candle envelopes of the same material
  - E26 medium base
  - Silver heat sink paint
- Potential for 72 total variations on one set of long term testing!
  - 3 CCT x 2 Finish x 3 Envelopes x 2 bases x 2 colors



# What is NOT an Allowable Variation

- Lamps
  - A globe lamp and an A19 type lamp of the same basic electrical construction
  - LED lamps with different heat sinks
  - CFL bare and covered lamps of otherwise identical construction
- Luminaires
  - Changes in heat sinking components
  - Changes in lamp wattage or number of lamps
  - Adding luminaires of a lower CCT than the tested product



# Luminaires V1.2



**Table 1: Allowable Variations Within Product Families**

Housing / Chassis	Allowed so long as the light source or lampholder, ballast or driver, and heat sink (as applicable) are integrated into housing / chassis variations in such a way that the thermal performance of the luminaire is not degraded by changes to the housing / chassis. Thermal measurements of each variation may be required (e.g. ballast case temperature, $TMP_{LED}$ , or $TMP_C$ ).
Heat Sink / Thermal Management Components	Not allowed.
Finish	Allowed.
Mounting	Allowed.  Luminaire photometry test reports generated for outdoor post-mounted luminaires may be used to certify outdoor porch (wall-mounted), outdoor ceiling or close-to-ceiling mounted and outdoor pendant luminaires within the same product family, in place of the source photometry requirements, so long as the bill of materials for each luminaire type is identical except for mounting hardware.
Electrical Connection (SSL Downlight Retrofits)	Allowed (e.g. E26 and GU24).
Reflector / Trim	Allowed so long as luminaire light output is not reduced.
Shade / Diffuser	Allowed so long as neither luminaire light output nor air flow are reduced.
Light Source  (refers to the make and/or model of the source; also review CCT below)	Allowed so long as variations will not negatively impact luminaire's compliance with any performance criteria in this specification.
Correlated Color Temperature (CCT)  (also review Light Source above)	Allowed so long as the lamp series or LED package/module/array series (and associated drive current), ballast or driver, and thermal management components are identical, and so long as variations will not negatively impact luminaire's compliance with any performance criteria in this specification.  The representative model shall be the version within the product family with the lowest CCT.  Partner shall use different luminaire model numbers to distinguish between models shipped with light sources of varying CCTs.
Ballast / Driver	Allowed so long as variations will not negatively impact luminaire's compliance with any performance criteria in this specification. Thermal measurements of each variation may be required (e.g. ballast case temperature or $TMP_C$ ).

# Luminaires V1.2 Examples



- Tested luminaire: A 6" CFL downlight using a single-wattage ballast and one 18W 4 pin lamp
  - CCT = 2700K
  - Trim = White
  - Reflector = Black baffle
  - Lamp = ABC Lamp Company CFL18/4P/827
  - Ballast = XYZ Ballast model 118
  - Mounting = Surface
  - Intended for commercial and residential use
  - Mounting = Pendant

# Luminaires V1.2 Examples



- The manufacturer wants to add the following family variations:
  - 3500K, 4100K and 5000K CCTs (100-hour testing)
  - Trims = Nickel, Bronze, Black
  - Reflectors = White reflector, specular reflector, square aperture specular (100-hour testing)
  - Additional Sources =
    - ABC Lamp Company CFL18/4P/835, CFL18/4P/841, CFL18/4P/850
    - Generic Lamps Inc. 18W/CFL/4-P/827, 18W/CFL/4-P/835, 18W/CFL/4-P/841, 18W/CFL/4-P/850
  - Additional Ballast = Generic Ballast Co. Model 1x18RS
  - Mounting = Pendant
- Potential for 128 total variations on one set of lifetime testing and some additional initial performance testing

# POP QUIZ!



- A manufacturer has a PAR30L LED Lamp and they want to add allowable variations:
  - Tested Lamp:
    - PAR30L
    - 15 Watts 900lm
    - 3000K
    - 24 degree beam angle
    - Black anodized aluminum swirl fin design heat sink
    - E26 base



# POP QUIZ



- A manufacturer has a PAR30L LED Lamp and they want to utilize the following as allowable variations:
  - PAR30S
    - **NO**
  - 18 Watts 975lm
    - **NO**
  - 2700K, 4000K, 5000K
    - **YES** (if partner determines 3000K represents worst case)
  - 14, 42 degree beam angles
    - **YES**
  - Bare aluminum, green anodized, and white painted heat sinks –
    - **YES** to bare and anodized
    - **NO** to painted
  - Straight fin design heat sink
    - **NO**
  - E26 and GU24 base
    - **YES**

- 15 Watts 900lm
- 3000K
- 24 degree beam angle
- Black anodized aluminum swirl fin design heat sink
- E26 base

# Time for Discussion



Questions or clarifications on resources?

Up Next

- Inseparable SSL
- Transition to Lamps V1.0
- Discussion / Q&A





# Inseparable SSL Luminaries

# What is an Inseparable SSL Luminaire?



- From the Luminaires V1.2 Specification:
  - A luminaire featuring solid state lighting components which **cannot be easily removed or replaced by the end user**, thus requiring replacement of the entire luminaire...

# What makes a Luminaire inseparable?



- Example features of an inseparable luminaire
  - Removal of solid state lighting components would require the cutting of wires, use of a soldering iron, or damage to or destruction of the luminaire
  - The light source could not be operated without the luminaire's heat sinking properties
  - The light source has no optical controls

# Examples:



## Ceiling Light

- Contains a circular board of bare LEDs
- The board is **soldered** to the driver leads
- The board uses the fixture frame as the heat sink
- The driver is located remotely and is **riveted** in place

• **USES INSEPARABLE REQUIREMENTS**



## Track Head

- Contains a Chip on Board LED array with a TIR Optic integrated into the luminaire housing
- The COB array is attached to a heat sink inside the luminaire that cannot be accessed without damaging the housing
- The COB array uses wire nuts to connect to the driver
- **USES ACCENT LIGHT REQUIREMENTS**

# Time for Discussion

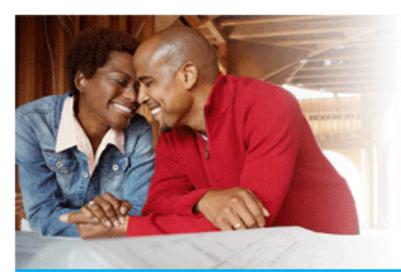


Questions or clarifications on resources?

Up Next

- Transition to Lamps V1.0
- Discussion / Q&A





# Transition to Lamps V1.0

# Notable Changes to Requirements

---

- Lamp Classifications
- Light Output, Efficacy and Luminous Intensity
- Color Quality
- Lumen Maintenance and Lifetime
- Reliability
- Packaging
- Dimming

# Specification Testing Changes



- New [ENERGY STAR Test Methods and Recommended Practices](#) published with the Lamps V1.0 Specification
- Test Methods
  - Require laboratory accreditation
- Recommended Practices
  - Do not require laboratory accreditation

# Elevated Temperature Life Testing



- Required for a wider range of lamps
  - Omnidirectional CFL and LED
  - Directional Lamps
- Exemptions:
  - Decorative lamps
  - Lamps not rated for enclosed or recessed fixtures

# Elevated Temperature Life Testing



- 3 testing options:
  - Option A: Operate lamps in a recessed can fixture
    - Passive temperature control
  - Option B: Operate lamps in an elevated temperature apparatus
    - Active temperature control
  - Option C: Operate lamps in an elevated temperature space
    - Active temperature control

# Elevated Temperature Life Testing



- Option A available for all lamps requiring Elevated Temperature Life Testing (ETLT)
- Two different temperatures for Options B and C
  - $45^{\circ}\text{C} \pm 5^{\circ}\text{C}$ 
    - Omnidirectional lamps  $\geq 10\text{W}$
    - Directional lamps  $\leq 20\text{W}$
  - $55^{\circ}\text{C} \pm 5^{\circ}\text{C}$ 
    - Directional lamps  $> 20\text{W}$

# Ambient Temperature Life Testing



- No retesting anticipated
  - Nearly identical test conditions and procedures as the Integral LED Lamps specifications
  - Organized and clarified into a life test method for SSL Lamps
- Certification Body needs to review test conditions before accepting

# Elevated Temperature Light Output Ratio



- Comparison of the light output at ambient temperature vs. elevated temperature
- Nearly identical test conditions and procedures as the CFL specifications
- Directional SSL lamps will need this test
  - Exemption for lamps not required to undergo ETLT

# Start Time Test



- **NEW** test method developed to address the consistency issue of the start time requirement
- **ALL LAMPS** must be evaluated using new test method before being certified to Lamps V1.0
- Start Time Test results may impact the Rapid Cycle Stress Testing needed for CFLs

# Run Up Time Test



- **NEW** test method developed to address the consistency issue of the run up requirement
- **ALL CFL LAMPS** must be evaluated using new run up test method before being certified to Lamps V1.0
- Requirements simplified to covered or non-covered
  - No more trying to determine if a lamp has amalgam

# Dimming Testing



- Primary data collection from partners will be the Dimming Data Collection Sheet
  - Limited values will be collected through QPX
  - CBs send data sheets to [lighting@energystar.gov](mailto:lighting@energystar.gov)
- Tests are designed to be flexible with equipment used
  - Integrating sphere is not required
    - Absolute and/or relative methods are acceptable
  - An anechoic chamber is not required
- These are Recommended Practices

# Use of Existing Data

---



- Can the existing data be used?
  - Yes, with some caveats
- Will additional testing be necessary?
  - Yes, as discussed earlier with some of the new ENERGY STAR test methods and specification requirements

# Considerations For Existing Data



- Age of data
  - Can the partner substantiate that the product is unchanged from the date of testing?
  - Note: CFL 4.0 originally called for retesting every 36 months
- Test method
  - Has the test method been updated?
    - If so, are the test conditions consistent?
- Laboratory Recognition
  - Was lab was properly accredited when testing was completed?
  - Is the laboratory recognized by the EPA for Lamps V1.0?
- Some requirements may necessitate additional testing or partial re-testing



# Lumen Maintenance and Lifetime



- Examples:
  - **7W PAR20 LED:** Certification to Integral LED Lamps specification did not require ETLT, but Lamps V1.0 requires ETLT at  $45^{\circ}\text{C} \pm 5^{\circ}\text{C}$ 
    - If it is intended for use in recessed or enclosed fixtures
  - **21W PAR38 LED:** Certification to Integral LED Lamps specification required ETLT at  $45^{\circ}\text{C}$ ; Lamps V1.0 requires ETLT at higher temperature,  $55^{\circ}\text{C}$  because its  $>20\text{W}$ 
    - An 18W PAR38 LED could utilize  $45^{\circ}\text{C}$  data

# Lumen Maintenance and Lifetime



- More examples:
  - **13W Bare Spiral CFL:** Certification to the CFL specification did not require ETLT, but Lamps V1.0 requires ETLT at  $45^{\circ}\text{C} \pm 5^{\circ}\text{C}$ 
    - If it is intended for use in recessed or enclosed fixtures.
  - **23W R40 CFL:** CFL specification required ETLT at  $55^{\circ}\text{C}$ , so re-testing is likely not needed
    - If it is intended for use in recessed or enclosed fixtures.
  - **18W R40 CFL:** Certification to the CFL specification required ETLT at  $55^{\circ}\text{C}$ , as this is more stringent than Lamps V1.0, the lamp does not require re-testing
    - If it is intended for use in recessed or enclosed fixtures.

# Rapid Cycle Stress Test



- Many LED and CFL lamps will require additional cycles
  - LEDs with a rated lifetime of 25,000 hrs
  - CFLs with a start time of  $\geq 100$  ms
  - If the original samples used for cycling **are available**:
    - Additional test cycles can be conducted on the samples to meet the number of cycle requirements
  - If the original samples **are not available**:
    - Lamp model must be re-tested

# Rapid Cycle Stress Test



- Examples:
  - **7W PAR20 LED 25,000 hour life:** Certification to the Integral LED Lamps specification required 12,500 cycles, but Lamps V1.0 requires 15,000.
  - **13W CFL Bare Spiral 12,000 hour life 172 ms Start Time:** Certification to the CFL specification required 6,000 cycles, but Lamps V1.0 requires 12,000 cycles
    - If the same CFL has a 72 ms start time it would not need additional testing

# Photometry



- Light Output and Luminous Efficacy
  - Testing referenced in older specifications is consistent with (or tighter than) current testing and is likely usable
- Luminous Intensity
  - All PAR and MR lamps need the data, which SSL lamps will have and should be usable but CFLs will need testing
  - Omnidirectional SSL performance requirements have been updated, requiring analysis of distribution data
  - Decorative lamps now require intensity distribution testing to meet the zonal lumen requirement

# Classifying Lamps

- Use caution with similar nomenclature lamps:
  - B (Bulged) is decorative, BR (Bulged Reflector) is directional, BT (Bulged Tubular) is omnidirectional.
- Decorative Lamps
  - A non-standard snow cone faux A-lamp is NOT a decorative globe



# Classifying Lamps



- Standard vs. Non-Standard:
  - CFLs may be standard or non-standard
  - LED Lamps must meet basic expectations for standard lamps (MOL, MOD, CBCP, distribution)
- Omnidirectional ANSI Standard lamps should target the ANSI MOL and MOD



# CFL Topics



- Equivalency Claims – 2 scenarios
  - Lamp meets ANSI MOL and MOD
    - May claim equivalency to wattage and shape
  - Lamp does not meet ANSI MOL and MOD
    - May claim equivalency to wattage without referencing shape

# Labeling Enclosed/Recessed



- Lamps intended for recessed or enclosed fixtures need to be tested accordingly
- For lamps to be exempt from ETLT, they must be labeled (lamp and packaging) as follows:
  - Omnidirectional lamps labeled “not for use in enclosed fixtures”
  - Any lamp labeled “Not for use in recessed fixtures”
  - If labeling does not appear, on both lamp and packaging, it’s not exempt



# Electrical Tests



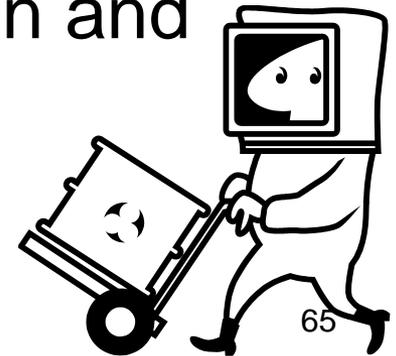
- Transient
  - Specific test is identical
    - Reference document updated to more recent version
- Power Factor
  - Updated test method year for CFLs
- Electrical Safety
  - Essentially unchanged
- EMI / RFI
  - Talk to the FCC



# Toxics Reduction



- Allowable mercury significantly reduced
  - By approximately 50%
- Additional substances considered
  - Lead, Cadmium, PBB, PBDE, and Hexavalent Chromium
- Documentation is not reviewed by the CB
  - Partner must maintain documentation and provide if requested by EPA



# What's Next?

---



- ENERGY STAR® and NEMA Lighting Road Mapping Meeting
- January 30th 2014 – Rosslyn, VA
  - ENERGY STAR Lighting Outlook
  - Lighting Industry Outlook
  - Efficiency Program Outlook

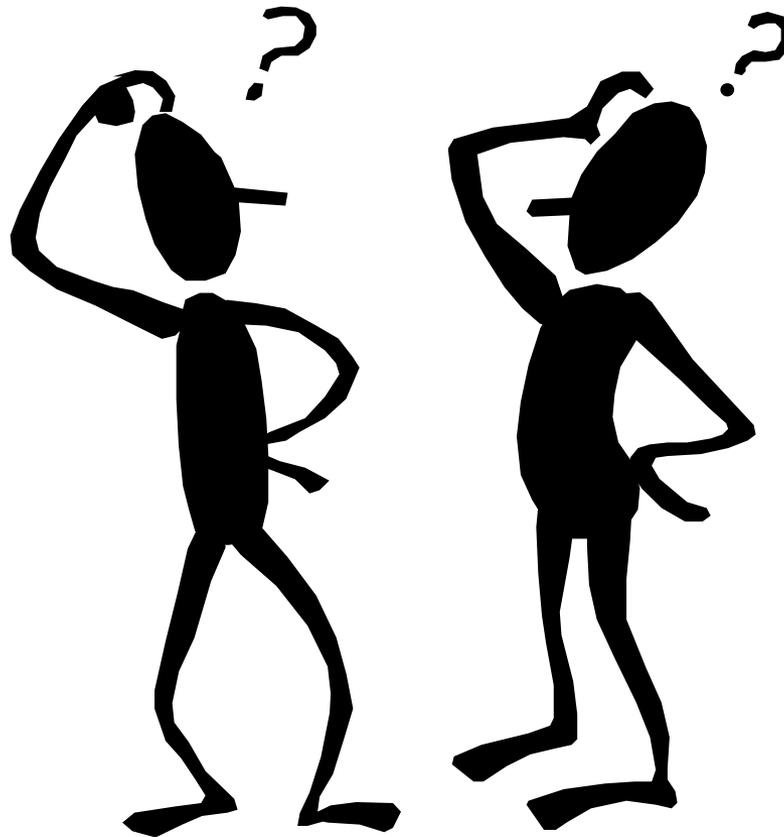
# What's Next?



- LIGHTFAIR® International 2014
- ENERGY STAR Lighting Certification Short Course
- Monday, June 2, 2014 – 2:00PM – 5:00PM
- LIGHTFAIR Pre-Conference program

# Questions

- Time for some Q&A!





**Thank you!**